

**REMARKS**

Claims 1, 3, 5, 7 and 9 have been amended. Claim 6 has been canceled. Upon entry of these amendments, claims 1-5 and 7-9 are pending and under consideration.

**I. AMENDMENTS TO THE CLAIMS**

Applicants have amended claim 1 to incorporate the language of Claims 6 and 9 to clearly define the function of the metal nanoparticles. Support for this amendment can be found, for example, in the originally filed claims 6 and 9. Claim 6 has been canceled as redundant.

Claims 3 and 5 have been amended to employ proper Markush group language.

Claim 7 has been amended to correct dependency.

Claim 9 has been amended for clarity.

No new matter has been introduced by these amendments. Accordingly, entry thereof is respectfully requested.

**II. REJECTION UNDER 35 U.S.C. 102**

Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Korgel *et al.* (U.S. publication 2003/0003300). In particular, the Examiner alleges that Korgel *et al.* disclosed each and every element of claims 1-5. This rejection is traversed. Reconsideration is respectfully requested.

With respect to Claim 1, the Examiner alleges that Korgel *et al.* disclose an emitting layer including at least metal nanoparticles and a luminescent polymer of the claimed invention. However, Korgel *et al.* do not teach or even suggest the metal nanoparticles and the luminescent polymer of the claimed invention. As described in paragraph [0142], lines 8-11 of Korgel *et al.*, nanoparticle based light emitting devices may not require a polymer to emit, and polymers may inflict losses through absorption, scattering, and poor electron-hole interfaces. This means that the nanoparticles described in Korgel *et al.* are used as a light emitting material, and the polymer is not used for luminescence. In the claimed invention, however, the light emitting material is not the metal nanoparticle but the luminescent polymer. The metal nanoparticles of the claimed invention are used to absorb the energy of triplet excitons of the luminescent polymer. As recited in amended Claim 1, the metal nanoparticles are mixed in a very low volume fraction of  $1 \times 10^{-9}$  to 0.1 with the luminescent

polymer. It is obvious that the metal nanoparticles in the claimed invention cannot play a role of the light emitting material due to the low volume fraction.

With respect to Claim 4, the Examiner alleges that Korgel *et al.* disclose the luminescent polymer generating light with a wavelength between 400 and 800 nm. However, Korgel *et al.* do not disclose the luminescent polymer generating light. As described in paragraph [0010] of Korgel *et al.*, the particles emit light in the visible wavelengths. In other words, in Korgel *et al.*, the light emitting material generating light is not the polymer but the nanoparticles.

Therefore, as Korgel *et al.* do not teach each and every limitation of claims 1 and 4, and, therefore, do not anticipate these claims. Nor the reference anticipates claims 2, 3 and 5, which depend upon claim 1. Accordingly, it is respectfully requested that the rejection of claims 1-5 under 5 U.S.C. 102(e) be withdrawn.

### **III. REJECTION UNDER 35 U.S.C. § 103**

Claims 6 and 9 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over Korgel *et al.* (U.S. publication 2003/0003300) in view of Duggal *et al.* (U.S. Patent No. 6,515,314). In particular, the Examiner alleges that it would have been obvious to a skilled artisan, at the time the invention was made, to modify the light-emitting device of Korgel *et al.* to include nanoparticles mixed with the luminescent polymer at a given volume fraction to arrive at the device recited in claims 6 or 9. This rejection is traversed. Reconsideration is respectfully requested.

The rejection of claim 6 is moot in view of cancellation of this claim. The subject matter of claim 6 is incorporated in claim 1. Accordingly, we refer to the arguments made in the instant response with respect to claim 1. As explained in section II above, the nanoparticles described in Korgel *et al.* are used as a light emitting material. To the contrary, in the claimed invention, the light emitting material is not the metal nanoparticle but the luminescent polymer. Accordingly, the art cited by the Examiner cannot render the claimed invention obvious, as the same function is performed by different structures. Claim 9 depends from claim 1. Therefore, the same arguments apply to claim 9 as well.

Duggal *et al.* do not remedy the deficiencies of Korgel *et al.* The Examiner alleges that Duggal *et al.* disclose an organic light-emitting device wherein the nanoparticles are mixed with the luminescent polymer at a volume fraction of  $1 \times 10^{-9}$  to 0.1. The Examiner

further alleges that the volume fraction is tailored to give a desired luminescence. However, Duggal *et al.* do not disclose the nanoparticles mixed in a volume fraction of  $1 \times 10^{-9}$  to 0.1 with the luminescent polymer. In column 6, lines 29-31 of Duggal *et al.*, the electroluminescent organic material is either a low molecular weight organic material or a polymeric material having unsaturated bonds. Thus, Duggal *et al.* merely disclose the types of materials to be the electroluminescent organic material without mentioning the volume fraction of each material in the mixture. In column 6, lines 53-55 of Duggal *et al.*, the phosphor nanoparticles are dispersed in the organic electroluminescent film-forming material, and a phosphor composition of less than about 30, preferably of less than about 10 percent by volume of the mixture of organic material and phosphor is used. The phosphor nanoparticles of Duggal *et al.* are part of the light emitting material. Therefore, the phosphor nanoparticles of Duggal *et al.* are distinguishable from the metal nanoparticles for adsorbing the energy of triplet excitons of the luminescent polymer, as instantly claimed.

Therefore, Applicants respectfully submit that the art cited by the Examiner, viewed alone or in combination, does not render the instant invention obvious. Accordingly, it is respectfully requested that the rejection of claims 6 and 9 under 35 U.S.C. 103(a) be withdrawn.

#### **IV. ALLOWABILITY OF CLAIMS 7 AND 8**

Claims 7 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In view of the amendments to Claim 1, which claims 7 and 8 depend upon, it is believed that these claims are in condition for allowance.

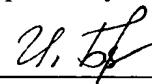
**CONCLUSION**

In light of the above amendments and remarks, Applicants respectfully submit that claims 1-5 and 7-9 satisfy all the criteria for patentability, and respectfully request that the Patent Office consider this application with a view towards allowance.

No fees other than the time extension fee is believed to be due. However, the Commissioner is hereby authorized to charge any required fee(s) to Jones Day Deposit Account No. 50-3013 (referencing Attorney Docket No. 8111-036-999).

Respectfully submitted,

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